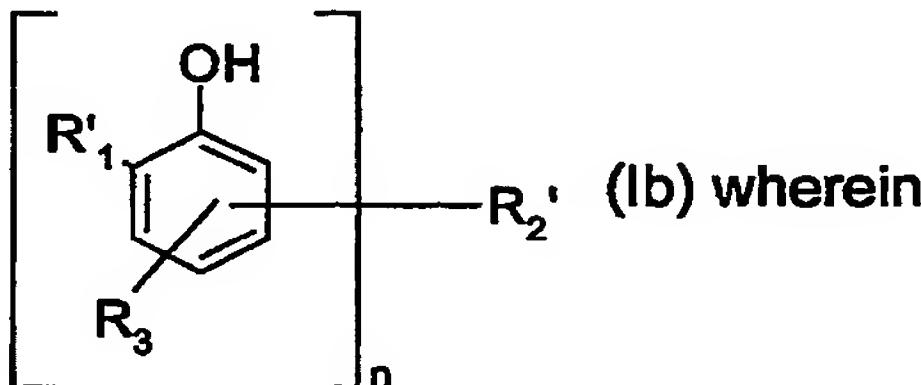
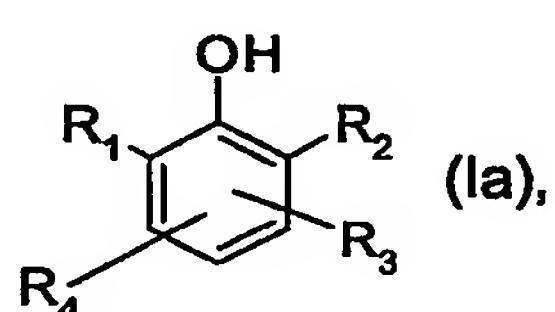


## Claims

## 1. A composition comprising

- 5           c) a halogen containing polymer or copolymer in the form of an aqueous suspension or emulsion;
- d) a sterically hindered phenolic antioxidant with a melting point of more than 20° C containing a compound of formula (Ia) or (Ib)



10           n is 2 or 3

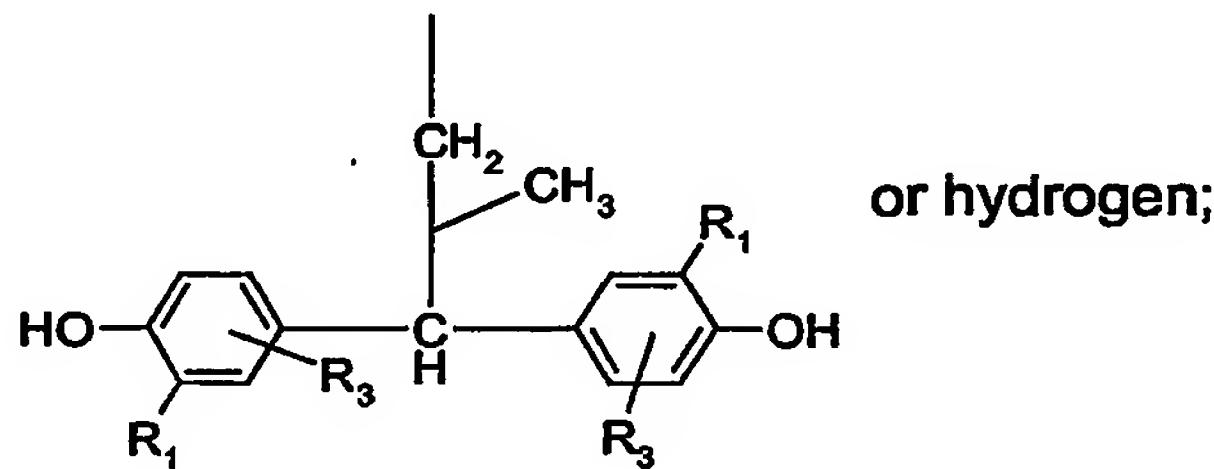
R<sub>1</sub> is tert.-butyl, secondary bound C<sub>3</sub>-C<sub>18</sub>alkyl or C<sub>5</sub>-C<sub>6</sub>cycloalkyl;

R'<sub>1</sub> is tert. butyl, primary or secondary bound C<sub>1</sub>-C<sub>18</sub>alkyl, phenyl, C<sub>7</sub>-C<sub>9</sub>phenyl-alkyl or C<sub>5</sub>-C<sub>6</sub>cycloalkyl;

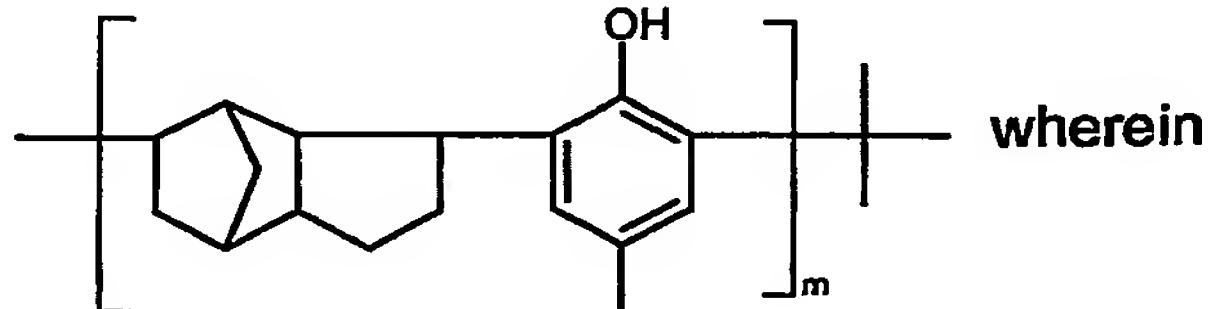
R<sub>3</sub> is C<sub>1</sub>-C<sub>18</sub> alkyl, C<sub>1</sub>-C<sub>18</sub>alkoxy, C<sub>5</sub>-C<sub>6</sub>cycloalkyl or -CH<sub>2</sub>-CH<sub>2</sub>-CO-O-(C<sub>1</sub>-C<sub>18</sub>)alkyl;

15           R'<sub>2</sub> is a divalent or trivalent bridging group;

R<sub>4</sub> is a group



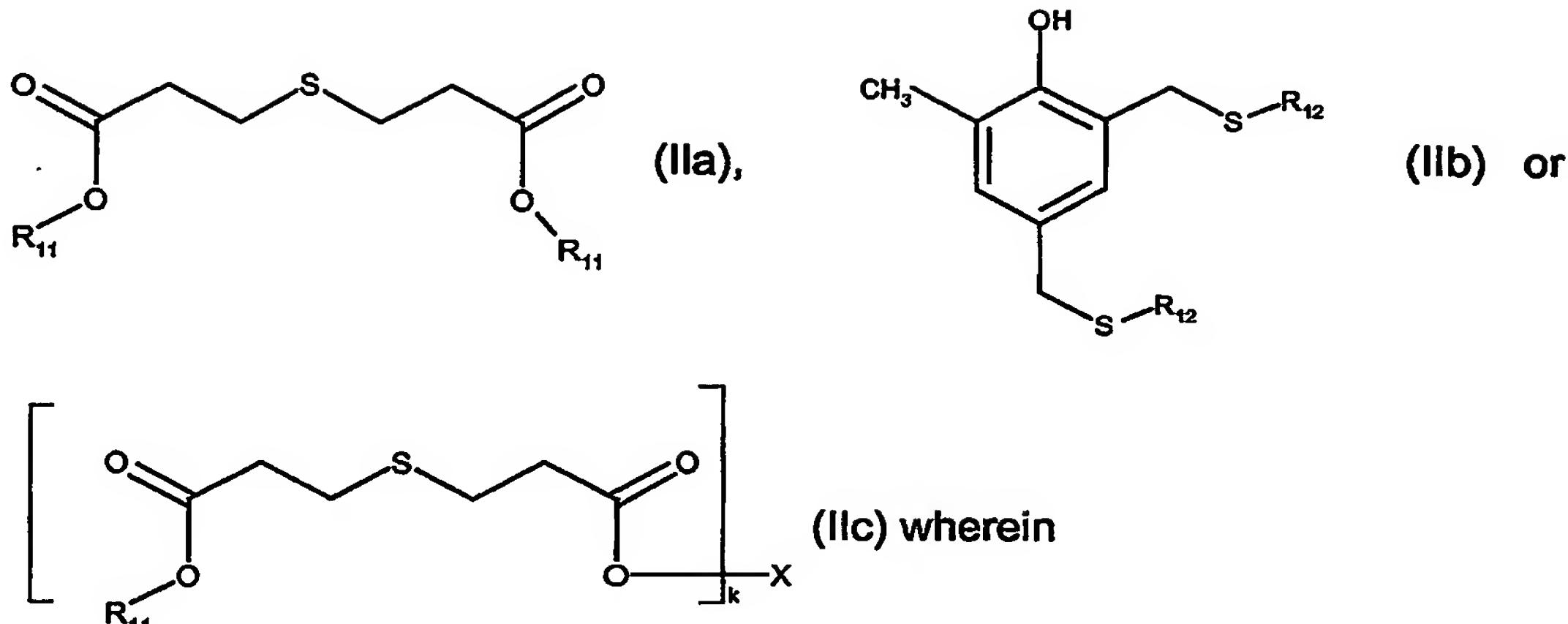
R<sub>2</sub> is hydrogen, methyl or a group



m is a number from 1 to 10; and

- 20           c) a thioether or thioether-ester with a melting point of more than 20° C of formula (IIa), (IIb) or (IIc)

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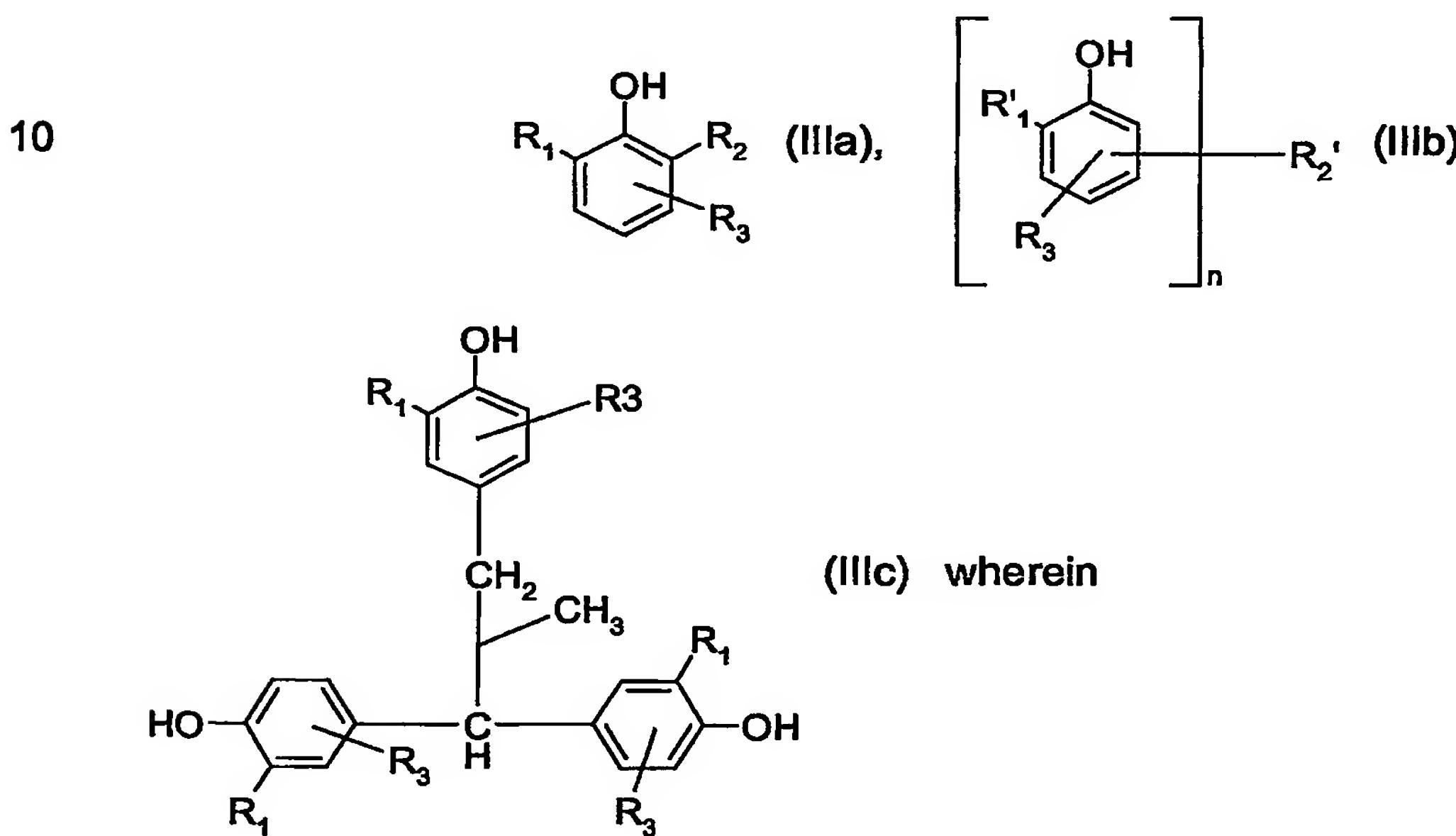


$R_{11}$  and  $R_{12}$  are independently  $C_1-C_{18}$ alkyl

$k$  is 2-4; and

5            $X$  is 2-methyl-1,2,3-propane-triyl- or 1,2,3,4-methane-tetryl-.

2. A composition according to claim 1 wherein the sterically hindered phenolic antioxidant containing a structural element of formula (Ia) or (Ib) is of formulae (IIIa), (IIIb) or (IIIc)



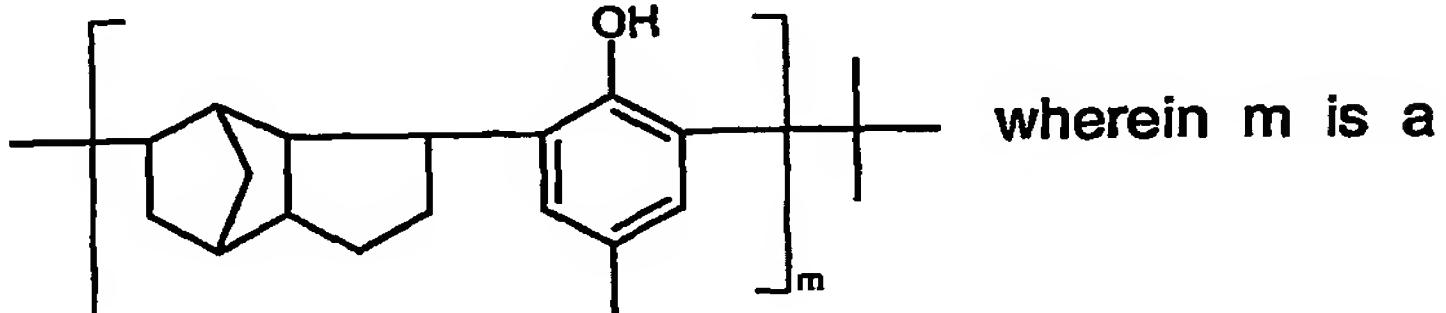
n is 2 or 3

$R_1$  is tert.-butyl, secondary bound  $C_3-C_{18}$ alkyl or  $C_5-C_6$ cycloalkyl;

15            $R'_1$  is tert. butyl, primary or secondary bound  $C_1-C_{18}$ alkyl, phenyl,  $C_7-C_9$ phenyl-alkyl or  $C_5-C_6$ cycloalkyl;

$R_3$  is  $C_1-C_{18}$  alkyl,  $C_1-C_{18}$  alkoxy,  $C_5-C_6$ cycloalkyl or a group  
 $-CH_2-CH_2-CO-O-(C_1-C_{18})alkyl$ ;  
 $R'_2$  is  $C_1-C_{12}$ alkylene, -S-, trimethylene-isocyanurate, or a group  
 $-CH_2-CH_2-CO-(OCH_2CH_2)_p-O-CO-CH_2CH_2-$  wherein p is a number from 1 to 3;

5     $R_2$  is hydrogen, methyl or a group



wherein m is a

number from 1 to 10.

3. A composition according to claim 1 wherein the halogen containing polymer is PVC.

10    4. A composition according to claim 1 wherein in component c) both  $R_{11}$  are  $C_{12}$ alkyl or  $C_{18}$ alkyl and the  $R_{12}$  are  $C_{12}$ alkyl.

15    5. A composition according to claim 1 wherein in component b) the sterically hindered phenolic antioxidant is

15    2-tert-butyl-4,6-dimethylphenol;  
 2,4-dimethyl-6-(1'-methylundec-1'-yl)phenol, 2,4-dimethyl-6-(1'-methylheptadec-1'-yl)phenol,  
 2,4-dimethyl-6-(1'-methyltridec-1'-yl)phenol, 2,4-dimethyl-6-(1'-methyltetradec-1'-yl)phenol  
 and mixtures thereof;  
 2,2'-methylenebis(6-tert-butyl-4-methylphenol), 2,2'-methylenebis(6-tert-butyl-4-ethylphenol),  
 20    2,2'-methylenebis(4,6-di-tert-butylphenol), 2,2'-ethyldenebis(4,6-di-tert-butylphenol), 2,2'-  
 ethyldenebis(6-tert-butyl-4-isobutylphenol)  
 or  
 (ethylenebis(oxyethylene)bis[3-(5-tert-butyl-4-hydroxy-m-tolyl)propionate].

25    6. A composition according to claim 1 wherein in component b) the sterically hindered phenolic antioxidant is  
 2-tert-butyl-4,6-dimethylphenol, 2,4-dimethyl-6-(1'-methyltetradec-1'-yl)phenol or a mixture  
 thereof  
 and component c) is  
 30    di-lauryl-thio-di-propionate, di-stearyl-thio-di-propionate or a mixture thereof.

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7. A composition according to claim 1 wherein in component b) the sterically hindered phenolic antioxidant is

2,4-dimethyl-6-(1'-methyltetradec-1'-yl)phenol

and component c) is

5 di-lauryl-thio-di-propionate.

8. A composition according to claim 1 wherein the sterically hindered phenolic antioxidant, component b) is present in an amount from 50 ppm to 2000 ppm based on the weight of the halogen containing monomer.

10

9. A composition according to claim 1 wherein component c) is present in an amount from 50 ppm to 2000 ppm based on the weight of the halogen containing monomer.

15

10. A composition according to claim 1 wherein the ratio of component b) to component c) is from 1:10 to 10:1.

11. A composition according to claim 1, which additionally contains a sterically hindered phenolic antioxidant different from that of component b), a phosphorous containing stabilizer, a 2-benzofuranone stabilizer, a sterically hindered amine light stabilizer or a UV-absorber.

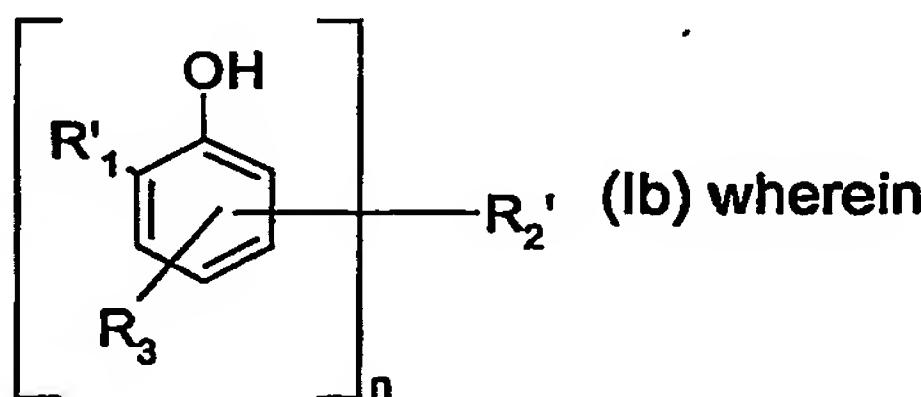
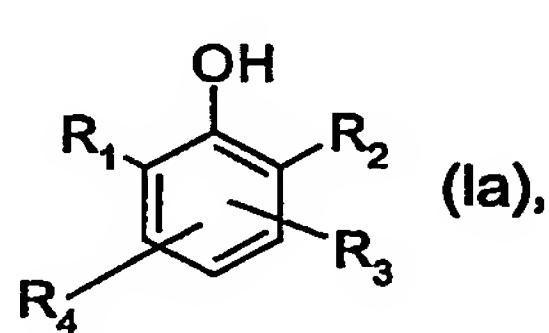
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12. A process for the stabilization of halogen containing polymers against thermal degradation, which process comprises

adding to the halogen containing polymer, which is in an aqueous suspension or emulsion during or after the polymerization process

25

b) a sterically hindered phenolic antioxidant with a melting point of more than 20° C containing a compound of formula (Ia) or (Ib)



n is 2 or 3

30 R<sub>1</sub> is tert.-butyl, secondary bound C<sub>3</sub>-C<sub>18</sub>alkyl or C<sub>5</sub>-C<sub>6</sub>cycloalkyl;

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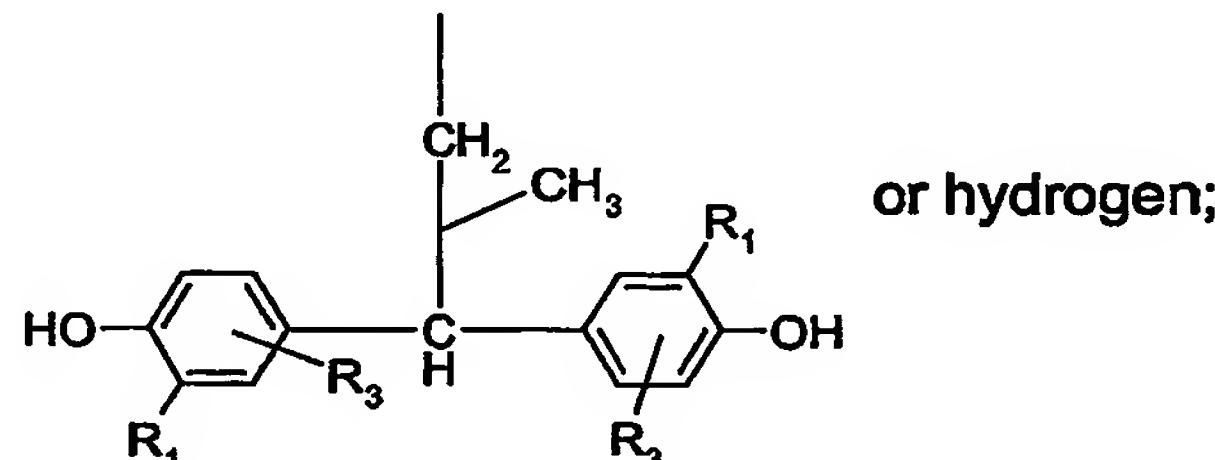
R'1 is tert. butyl, primary or secondary bound C<sub>1</sub>-C<sub>18</sub>alkyl, phenyl, C<sub>7</sub>-C<sub>9</sub>phenyl-alkyl or C<sub>5</sub>-C<sub>6</sub>cycloalkyl;

$R_3$  is  $C_1-C_{18}$  alkyl,  $C_1-C_{18}$  alkoxy,  $C_5-C_6$ cycloalkyl or  $-CH_2-CH_2-CO-O-(C_1-C_{18})$ alkyl;

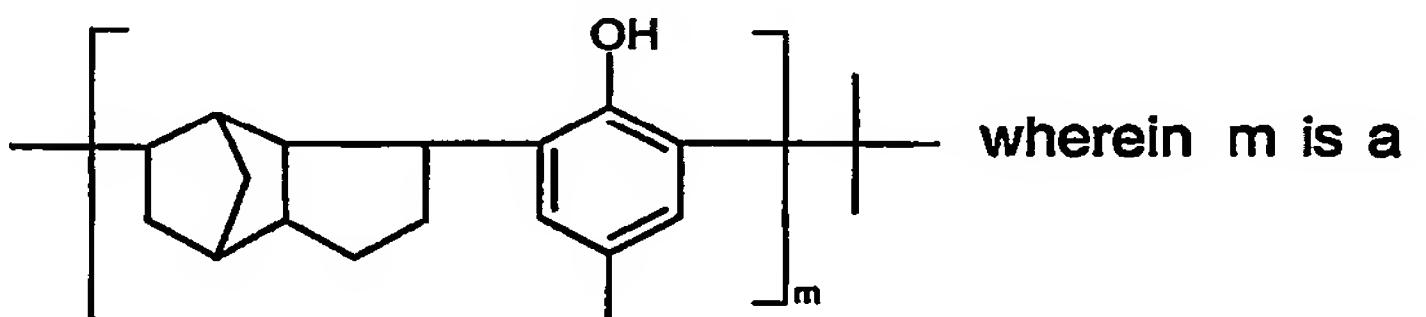
**R'₂ is a divalent or trivalent bridging group;**

5

$R_4$  is a group



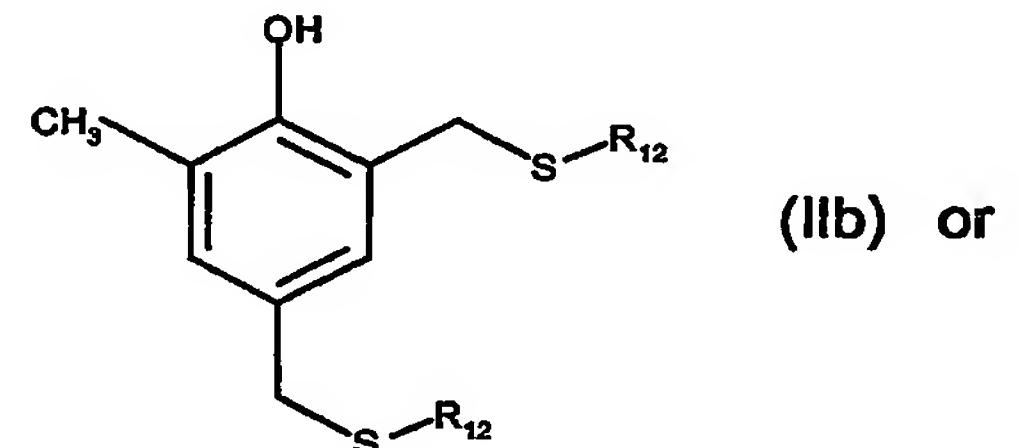
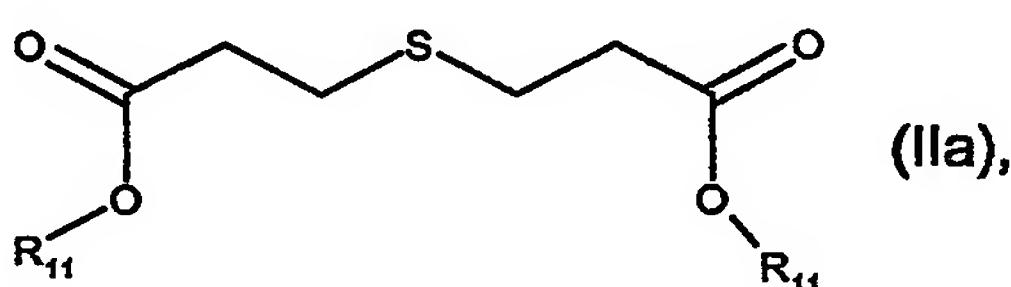
$R_2$  is hydrogen, methyl or a group



number from 1 to 10; and

c) a thioether or thioether-ester with a melting point of more than 20° C of formula (IIa), (IIb) or (IIc)

10



(1c) wherein

**R<sub>11</sub>** and **R<sub>12</sub>** are independently C<sub>1</sub>-C<sub>18</sub>alkyl

k is 2-4; and

X is 2-methyl-1,2,3-propane-triyl- or 1,2,3,4-methane-tetryl-.

15

13. A process according to claim 12 wherein the components b) and c) are added towards the end of the polymerization reaction.

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14. A process according to claim 12 wherein the polymerization is a suspension polymerization and the components a) and b) are added as an emulsion to the slurry towards the end of the polymerization reaction.
- 5    15. Use of a sterically hindered phenolic antioxidant with a melting point of more than 20° C together with a thioether or thioether-ester with a melting point of more than 20° C according to claim 1 for the thermal stabilization of aqueous suspensions or emulsions of halogen containing polymers.

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